

ORIGINAL ARTICLE

Placental retention in a bonobo (*Pan paniscus*)Michel Halbwx¹, Crispin Kamate Mahamba², Anne-Marie Ngalula² & Claudine André²¹ Max-Planck Institute for Evolutionary Anthropology, Leipzig, Germany² Lola ya bonobo sanctuary, Kinshasa, Democratic Republic of Congo**Keywords**

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Introduction

In human medicine, the third stage of parturition is the delivery of the placenta because of the contractions of the uterus. In women, a retained placenta is diagnosed when the placenta is not expelled within 30–60 minutes after birth [3].

This condition is rare in women (0.23%) [3] and primates in general, with only one published report of placental retention in a golden lion tamarin (*Leontopithecus rosalia*) [1] and has not been reported in apes. In captivity, female bonobos (*Pan paniscus*) typically reach sexual maturity between 6 and 11 years of age [7] and give birth to their first offspring between 13 and 14 years of age [6, 8]. The interbirth interval is 4–6 years [4, 8], with an average of six offspring produced over a female bonobo's 50–55 year life span [2]. Gestational length has been estimated between 220 and 230 days [2].

In this article we report an instance of placental retention that was observed in a bonobo at the Lola ya bonobo sanctuary in Kinshasa, Democratic Republic of Congo (DRC).

Material and methods**Clinical case report**

An 11-year-old, 29 kg, primiparous female bonobo was being monitored for parturition 210 days after the

Abstract

Background This case report describes the first placental retention in an 11-year-old female bonobo (*Pan paniscus*) following the delivery of a healthy infant.

Methods After unsuccessful medical treatment with oxytocin, the placenta was manually extracted.

Results and conclusions Both the dam and infant survived.

last observed estrus period. This female bonobo and its medical history were well known to sanctuary staff as the animal arrived at the sanctuary when it was approximately 2 years old. The 30 hectare sanctuary houses many orphaned bonobos which are divided into different groups based on their social affinity. The bonobos usually arrive at the sanctuary when they are 1.5–3.5 years old, because they have been confiscated by the authorities for illegal ownership.

As all great ape species, bonobos are threatened by population fragmentation, habitat loss and hunting for bushmeat. In the last case, the usual scenario is that adult bonobos are killed for their meat while orphaned infants are sold as pets. When found, these orphan bonobos are confiscated by the Ministry of Environment and entrusted to Lola ya bonobo sanctuary. These young infants begin their life at the sanctuary in quarantine, under the close care of a human substitute mother, but are rapidly integrated into a peer group in the sanctuary's nursery. Depending on their psychological condition, newly arrived bonobos may remain totally dependent on their substitute mothers for several months. Once they have fully integrated into the nursery group and gained confidence, a period which may range from 6 months to 2 or even 3 years, the infants are integrated into one of the larger mixed-age social groups.

Because of previous deaths in offspring of primiparous dams at the sanctuary, the managers had decided

to isolate the pregnant bonobo from its social group for close monitoring 2 months before the presumed birth date. The animal had no contraception history and its health status was good. Daily oral iron supplementation was started (10 ml oforofer[®], Emcure-pharmaceuticals LTD Pune -411026, India) 6 months into the pregnancy. The only behavioral changes noted in the week prior to parturition were polydipsia and the female was observed to be sometimes lying in a ventral position. Both behaviors were considered to be normal as all the pregnant bonobos from the sanctuary showed similar behavioral changes prior to parturition.

The bonobo gave birth 210 days after the last observed estrus. Initial maternal care appeared appropriate and the general health status of both dam and infant were good, even though the dam did not eat anything during the first day. The infant was observed suckling, but remained attached to its dam by the umbilical cord. It was 26 hours postpartum before the umbilical cord broke.

Typically in this species, the placenta is expelled shortly after birth. As this did not occur, the bonobo was placed under close monitoring to watch for any signs of placental delivery. Several times during the first 11 hours after parturition, the female bonobo braced on all four limbs and strained from presumed uterine contractions.

Results

Treatment

Five IU of oxytocin (Syntocinon[®] 5 IU/1 ml, Novartis pharma AG, 4056 Bale, Switzerland) was administered intramuscularly (IM) by dart (Telinject[®], 57230 Sturzelbronn, France) to increase the contraction of the uterus' smooth musculature and to trigger hemostasis of uterine blood vessels to prevent potentially fatal hemorrhage. Soon after the injection, additional uterine contractions were observed, similar to those noted earlier during the day, but no tissue was expelled. The dam, still anorexic, appeared weakened.

By 27 hours postpartum, approximately half of the placenta was visible at the vulva. At that time, two additional doses of 10 IU of oxytocin (Syntocinon[®] 5 IU/1 ml) 0.5 hour apart and one dose (400 mg) of amoxicillin (Amoxycillin inject, GlaxoSmithKline, 1332 Genval, Belgium) were administered IM by dart (Telinject[®]) which were unsuccessful in expelling the remainder of the placenta.

At this point, the bonobo was anesthetized for manual removal of the placenta. Ovariohysterectomy was not considered as a viable medical option in this case,

as half of the placenta was already exteriorized and accessible, the animal was in a weakened state, and a high priority was given to preserving the future breeding potential of this genetically valuable animal for the conservation of the species.

The female bonobo was immobilized with 100 mg of ketamine (Ketamine 1000[®], Virbac France, 06516 Carros cedex, France) and 1 mg of medetomidine (Domitor[®], Pfizer santé animale, 75014 Paris, France) both injected IM. The animal was afebrile, 6% dehydrated, and slight tachycardia (92 b/m) was noted during the anesthesia. Lactated Ringer's solution (Labo Minamie, 3039 Av Macon-Limete, Kinshasa, DRC) (350 ml) along with 10 ml of hypertonic glucose (Glucobic[®] 50%, Laboratoire B.I.S, BP 13.212 Kin1, Kinshasa, DRC) and 400 mg of amoxicillin (Clamoxyl[®], GlaxoSmithKline, 1332, Genval, Belgium) were given by intravenous perfusion during the anesthesia. The bonobo was also given 75 mg of diclofenac (Voltaren[®] injectable, 75 mg/3 ml, Novartis pharma, 92500 Rueil-Malmaison, France) injected IM for pain relief.

To remove the placenta, the bonobo was placed in dorsal recumbency. Sterile-gloved hands were inserted into the bonobo's vulva, but only 7 cm of the fingers were able to penetrate, because of a constriction in the vaginal vault, probably secondary to muscular contractions. This was sufficient, however, to carefully turn the placenta in both clockwise and anticlockwise directions, while an assistant massaged the animal's belly.

With gentle manipulation, the placenta was delivered in its entirety. Special care was taken to ensure that no part of the placenta remained in the uterus. Manual curettage of the uterus was not possible because of the constriction of the vagina's musculature.

Flushing the uterus with warm iodized povidone (Betadine[®] solution 1 g of iodine/100 ml, Viatrix, 33701 Mérignac cedex, France) to remove the after birth was considered, but the sepsis risk was judged too great. Instead of flushing the uterus, 0.2 mg of methylergometrin (methergin[®] 0.2 mg/ml, Novartis Pharma, 68330 Huningue, France) was administered IM to both wash out the afterbirth and prevent any hemorrhage.

Thirty minutes after manual removal of the placenta, 5 mg of atipamezole hydrochloride (Antisedan[®], Pfizer, Pfizer santé animale, 75014 Paris, France) were administered, and the female bonobo was returned to its cage with the infant. Two hours later the dam started eating and drinking.

The lochia, with a bloody appearance and no odor, started to be eliminated the day after the intervention. Two days after the intervention, the discharge became muco-hemorrhagic, probably because of cervical

mucus, and remained odorless. The dam also had a fever (38.1°C) and diarrhea.

Oral metronidazole (40 mg/kg b.i.d) (Flagyl® 125 mg/5 ml, Aventis, quai de la Rapée, 75601, Paris, France) was administered empirically to provide coverage for anaerobic bacteria. Boiled rice was its only dietary source for the next 3 days and to reinforce the medical treatment already established the bonobo was also given probiotics for the next 5 days.

The dam's health status improved rapidly over the following days. In total, the bonobo was treated with 9 days of amoxicillin and 2 days of diclofenac from the first day postpartum, 7 days of metronidazole and 5 days of probiotics from the second day postpartum. Methylethylergometrin was used just once 1 day postpartum and the oral iron started 6 months into the pregnancy was administered for 4 more days. The infant remained with the dam throughout the treatment period and remained healthy.

Discussion

Although the cause of the placental retention in this case remains uncertain, it could be attributed to uterine dynamic troubles, abnormality of placenta insertion to the uterus, or constriction of the cervix. Oxytocin injections stimulated additional uterine contractions but had little effect on the placenta's position, and resistance was detected when trying to remove the placenta. These findings, along with the lack of observed hemorrhage make uterine atony an unlikely cause of the placental retention in this case.

A more probable scenario is that the female bonobo initially had strict placental retention without hemorrhage, meaning that the placenta remained fixed to the uterus by cotyledons despite the contractions. Over the next 11–27 hours postpartum, the cervix also began to close. Once the bonobo received the oxytocin (Syntocinon® 5 IU/1 ml) 27 hours postpartum, the uterine contractions were useless because some parts of the placenta remained in the uterus, while other parts were trapped in the vagina by the closed cervix. This would cause the placenta to develop an hourglass shape. This scenario is supported by the fact that some placenta in the vagina was detectable, but could not be removed. The placenta appeared whole after the extraction.

In women with placental retention, postpartum hemorrhage is a major concern and is defined for a vaginal delivery as a loss of 500 ml or more of blood within 24 hours after delivery [5]. The occurrence of postpartum hemorrhage is significantly higher when the placenta is retained [5] because the

lack of normal uterine contracture prevents efficient hemostasis.

The case reported here is noteworthy because placental retention, while commonly reported in other species, has not been reported in apes. At the sanctuary Lola ya bonobo, placenta delivery typically occurs within 30 minutes after parturition. In the previous seven births that have occurred at the sanctuary, the times between parturition and placental delivery were 17, 12, 23, 29, 26, 19, and 15 minutes (Personal communication, Crispin Kamate Mahamba).

In human medicine, the risk of a retained placenta increases with previous caesarian section, previous retained placenta, a mother over 35 years of age, or parity greater than five [3]. This female bonobo had none of these risk factors. In human medicine, placental retention can be attributed to several etiologies: uterine atony, uterine distension, iatrogenic causes, or abnormalities of placental insertion. The limited diagnostic capabilities available at the sanctuary in Kinshasa did not permit further investigations into the underlying etiology in this case.

We believe that the placental retention in this bonobo was the result of an unexplained delay in expulsion of the placenta followed by a marked constriction of the vagina most likely because of muscular contraction. We hope this report will be of help to people working with captive great apes if faced with a similar situation.

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